XI. SOURCES AND METHODS FOR THE QUARTERLY ESTIMATES OF STATE PERSONAL INCOME

Quarterly estimates of state personal income begin with the first quarter of 1969. They are presented seasonally adjusted at annual rates.[1] After seasonal adjustment, cyclical and other short-term changes in the states' economies stand out more clearly. The quarterly estimates are presented at annual rates so that the quarterly and the annual estimates may easily be compared. For some components, the quarterly source data used to prepare the estimates are seasonally adjusted at the detailed series level when statistically significant seasonal patterns are present in the data. For other components, typically those that are insensitive to short-term changes in state-level economic conditions, the seasonally adjusted state estimates are derived from the seasonally adjusted national estimates and from the trend in the annual state estimates.

Revision schedule for the quarterly estimates

The quarterly personal income estimates are revised on a regular schedule to incorporate source data that are more complete, more detailed, or otherwise more appropriate than the data that were available when the estimates were initially prepared and to incorporate updated seasonal factors.[2] They are also revised to keep them consistent with revisions to personal income estimates in the National Income and Product Accounts (NIPA), to which they are controlled, and to annual state estimates, which incorporate more detailed and more reliable source data than the quarterly estimates.[3]

The first, or 'preliminary,' estimates for a quarter are prepared 3 months after the end of the quarter. The 'second' estimates for that quarter are prepared 3 months later. The estimates for that quarter continue to be revised every March and September in conjunction with the regularly scheduled revisions of the annual estimates (see table I).[4]

The estimates for the quarters of years for which annual estimates have been prepared are distributed from the annual estimates; the estimates for quarters after the last annual estimate are extrapolated from that estimate.[5]

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[1] See "Seasonal adjustment" and "Annual rates" in the "Glossary."

[2] See "Availability of the state estimates" in the "Introduction."

[3] The quarterly state estimates of wages and salaries are controlled to—that is they are made to sum to—the NIPA estimates of wages and salaries after adjusting for coverage differences, such as the exclusion of wages and salaries of U.S. citizens stationed abroad. See "Differences in geographic scope and in classifications between the national and the state estimates" in "THE SOURCES AND METHODS FOR THE ANNUAL ESTIMATES OF STATE PERSONAL INCOME AND DISPOSABLE PERSONAL INCOME"

[4] For additional information, see Robert L. Brown, Bruce T. Grimm, and Marian B. Sacks., "The Reliability of the State Personal Income Estimates," *Survey of Current Business* 70 (December 2003): 52-66.

[5] Two *distribution* techniques are used: One uses seasonally adjusted monthly or quarterly source data as the indicator series, and the other uses an indicator series generated from the relationships between the annual estimates for each state and the Nation. For the latter technique, the indicator series is a weighted average of the "fitted values" from bivariate regressions of the annual state estimates on the corresponding national estimate and a simple proportionate share of the national estimate. Weights are based on the coefficient of determination (R^2) from the regression.

The quarterly estimates are prepared in three steps. First, quarterly indicator series are prepared for the components for which state-level quarterly or monthly source data are available. Second, initial approximations of the quarterly estimates are prepared by distributing and extrapolating the annual estimates with the indicator series or according to the trend in the annual estimates (see footnote 5). Third, the initial approximations are used to allocate national control totals to states.

Annual estimates are distributed to quarters with the dual allocation procedure.[6] First, annual state estimates are distributed to quarters in proportion to their initial quarterly approximations. Then the results are adjusted proportionately so that they sum to the quarterly national controls.

After the second quarterly estimates are prepared, little new state-level quarterly source data become available. Therefore, the initial approximations of the revised quarterly estimates incorporate quarterly source data that are generally the same as the data used for the second quarterly estimates. The revised estimates differ from the second estimates mainly in their adjustment for consistency with revised national quarterly estimates and state annual estimates and in their adjustment for revised seasonal factors.

Control totals for the quarterly estimates

Quarterly national control totals for most components of state personal income are mainly derived from estimates of the corresponding component in the National Income and Product Accounts.[7] Two methods are used to prepare the national controls:

$$X_S^q = R^2(\hat{X}_S^q) + (1 - R^2)\left(\frac{Y_S^t}{Y_N^t} Y_N^q\right)$$

where X_S^q is the state indicator series, $\hat{X}_S^q$ is the "fitted value" for state S in quarter q of year t, Y_N^q is the national estimate for quarter q of year t, Y_S^t is the state estimate for year t, and Y_N^t is the national estimate for year t. $\hat{X}_S^q$ comes from solving, with quarterly-frequency data, a set of annual-frequency regressions estimated using rolling 7-year sample periods:

$$\hat{X}_S^q = \hat{a}^t + \hat{b}^t Y_N^q$$

where $\hat{a}^t, \hat{b}^t$ are the estimated slope and intercept from the regression with the sample period centered on year t (for the latest three years, the seven most recent observations are used).

Two *extrapolation* techniques are used: One uses the seasonally adjusted monthly or quarterly source data as the indicator series, and the other uses a slightly modified version of the weighted average formula

$$X_S^q = R^2(\hat{X}_S^q) + (1 - R^2)\left(\frac{Y_S^{t-1}}{Y_N^{t-1}} Y_N^q\right)$$

Notice that the ratio used in the second term refers to the previous year (t-1) whereas q refers to the current year (t) and that the "fitted value," $\hat{X}_S^q$, uses estimates $\hat{a}^{t-1}, \hat{b}^{t-1}$.

[6] See "Dual allocation" in the "Technical Notes."

[7] The estimates of personal income in the NIPAs differ from the national totals of state personal income because of differences in coverage, in the methodologies used to produce the estimates, and in the timing of the availability of the source data. See "Differences in definitions and classifications" in the "Overview."

For years in which detailed annual state estimates have been made, the quarterly national control totals for a component are derived from the distribution of annual sum-of-the-states estimates. Quarterly NIPA estimates are used as the indicator series for the distribution. For quarters after the last annual state estimate, national control totals for most components of personal income are extrapolated using the percent change in the quarterly NIPA estimates.

Exceptions to these general procedures are made in the case of wage and salary disbursements and farm proprietors' income:

Control totals for the quarterly estimates of wages and salaries.—In March, source data for wages and salaries that were not available when the NIPA estimates were prepared are sometimes used in the preparation of the control totals for the state estimates of wages and salaries.[8] The annual NIPA estimates of wage and salary disbursements for the most recent year is compared to an alternative annual estimate. The alternative is based primarily on BLS tabulations of wages and salaries of employees covered by unemployment insurance for the first three quarters and on a BEA estimate for the fourth quarter (based on CES data as described below). If the two series for the sum of all industries do not differ significantly, the NIPA estimates of wage and salary disbursements are used to prepare the control totals for the state quarterly estimates. Otherwise, the national control totals are derived for each industry using the alternative annual estimates.

Control totals for the quarterly estimates of farm proprietors' income.— For the preliminary and second state quarterly estimates, an annual estimate of farm proprietors' income for the current year is forecast using U.S. farm income estimates from the U.S. Department of Agriculture (USDA). This annual control is then distributed using the average of quarterly NIPA estimates, if available, and assuming that income is constant for the other quarters.

Sources and methods for personal income by component

Quarterly state-level source data are available to prepare preliminary and second estimates of three personal income components: wage and salary disbursements, farm proprietors' income and state unemployment insurance (UI) benefits (see table J). The estimates of wage and salary disbursements are then used to estimate four other components of personal income: supplements to wages and salaries, construction proprietors' income, employee and self-employed contributions for government social insurance, and the residence adjustment. Quarterly estimates of the remaining five components of personal income: dividends, interest, and rent, transfer receipts excluding state UI benefits, farm wages, pay of military reserves, and nonfarm proprietors' income excluding the construction industry are extrapolations of annual trends in state shares of the nation.[9]

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[8] The difference in the availability of the data for the estimates of wages and salaries is especially important because the revision to the national control totals of wages and salaries that are used in the preparation of the state estimates of wages and salaries in April sometimes foreshadows the direction and size of the revision to the NIPA estimates in July.

[9] These five components account for only 39 percent of personal income for the nation.

Wage and salary disbursements.[10]—The preliminary quarterly state estimates of wages and salaries for most NAICS sectors are extrapolated from the estimates for the previous quarter by the percent change in state employment data from the Current Employment Statistics (CES) survey from the Bureau of Labor Statistics (BLS).[11] The CES monthly employment data by NAICS sector are averaged to quarters and seasonally adjusted by BEA.

The second quarterly estimates for these industries incorporate state payroll data from the Quarterly Census of Employment and Wages (QCEW) that are compiled in the administration of the state unemployment insurance system. The QCEW is a nearly complete census of wages and includes exercised stock options and other lump-sum payments that are not captured in the CES earnings data. The wage data are summed to quarterly totals by NAICS sector and seasonally adjusted by BEA. These data are a substantially better source for the state estimates than the CES data, so the incorporation of these data accounts for the most important differences between the preliminary estimates and the second estimates of quarterly state personal income.

The wage and salary disbursements of farms, for both the preliminary and the second quarterly estimates, are based on trend extrapolation from the annual estimates. The preliminary estimate for the forestry, fishing, related activities and other industry is also based on trend extrapolation, but the second estimate is based on QCEW data.

Quarterly national payrolls from the Department of Transportation (DOT) and annual State employment from the Railroad Retirement Board are used to prepare both the preliminary and second estimates of wage and salary disbursements in the railroad industry.

The number of personnel and average pay by service from the Department of Defense (DOD) and payroll data from the Coast Guard are used to prepare both the preliminary and second estimates of wage and salary disbursements of active duty military personnel. The wages and salaries of military reserves are estimated by trend extrapolation.

Wage and salary disbursements to civilian employees of the Federal government, for both the preliminary and the second quarterly estimates, are based on CES employment data.

Supplements to wages and salaries.—The estimates of wage and salary disbursements are used to produce the quarterly estimates of supplements to wages and salaries by industry. Separate estimates are prepared of the two components of supplements: (1) employer contributions for employee pension and insurance funds and (2) employer contributions for government social insurance. Annual estimates of each

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[10] Wage and salary disbursements to private employees are estimated for all NAICS sectors. In addition, separate estimates are made for durable and nondurable manufacturing and for rail transportation and all other transportation and warehousing. Wage and salary disbursements to public employees are estimated for civilian employees of the federal government, active duty military, military reserves, and state and local government. All of these categories will be referred to as industries or NAICS sectors.

[11] The CES survey collects monthly data (on form BLS 790) on employment. This survey of about 400,000 nonagricultural establishments across the United States is conducted by the state employment security agencies and coordinated by the Bureau of Labor Statistics. The data are released about 3 weeks after the end of the month. The data for average hourly earnings exclude bonus payments and several other forms of wages and salaries. The Survey is conducted for the pay period that includes the 12th of each month and is benchmarked annually to the Quarterly Census of Employment and Wages (QCEW), also from BLS.

component of supplements are distributed to quarters using dual allocation and estimated wages in the corresponding industry as the indicator series. The initial approximations are extrapolated using the percent change in the estimates of wages in the corresponding industry.

Farm proprietors' income.—Quarterly state estimates of farm proprietors' income are derived from USDA data and quarterly national controls using the dual allocation procedure. Quarterly estimates of three components are prepared separately: farm subsidies; farm proprietors' income excluding subsidies; and special adjustments for unusual occurrences, such as natural disasters.[12]

The quarterly state estimates of farm subsidies are based on annual trends. Quarterly estimates of farm proprietors' income excluding subsidies are based on monthly USDA data on cash receipts from the sale of farm products. These cash receipts are controlled to quarterly national and annual state estimates. Quarterly estimates of the special adjustments are based on state-level information from the USDA.

Nonfarm proprietors' income.—Construction proprietors' income is extrapolated using construction wage and salary disbursements as the quarterly indicator. The rest of nonfarm proprietors' income is a trend extrapolation of the annual state estimates because monthly or quarterly source data are unavailable.

Personal current transfer receipts.—The quarterly estimates of state unemployment insurance (UI) benefits are distributed and extrapolated using state-level UI benefits data from the Employment and Training Administration of the Department of Labor. The quarterly estimates for all other personal current transfer receipts are based on trend distribution and extrapolation of the annual estimates.

Employee and self-employed contributions for government social insurance.—Quarterly estimates of employee and self-employed contributions for government social insurance are prepared using the estimates of wage and salary disbursements summed over all industries as the quarterly indicator.

Dividends, interest, and rent.—Both the preliminary and the second quarterly estimates of property income—personal dividend income, personal interest income, and rental income of persons—are derived from the trends in the annual state estimates, because monthly or quarterly source data are unavailable.

Residence adjustment.—The quarterly state estimates of the residence adjustment are calculated by subtracting estimates of the gross outflows from the gross inflows to each state.[13] Interstate gross flows consist of interstate commuters' wages and salaries, employer contributions for employee pension and insurance funds, and employee and self-employed contributions for social insurance Each annual gross flow is distributed and extrapolated to quarters by the quarterly estimates of the income subject to adjustment for the state of work.

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[12] See "Dual allocation" in the "Technical Notes."

[13] Each gross flow is an inflow to the state of the residence and an outflow from the state of work. For the methodology for the annual estimates, see the section "Residence Adjustments" in the methodology for the annual estimates.

Table I--Preparation and Revision Schedule
for Quarterly State Personal Income

	---------Estimates prepared in Year n+1--------------		
	Preliminary	Second	Revised
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January	3rd Quarter Year n	2nd Quarter Year n	
April	4th Quarter Year n	3rd Quarter Year n	All Quarters Years n-3 through n-1
July	1st Quarter Year n+1	4th Quarter Year n	
October	2nd Quarter Year n+1	1st Quarter Year n+1	All Quarters Years n-2 through n

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Table J. Sources and Methods for the Quarterly and Annual Estimates of State Personal Income

Components of personal income	Extrapolators for preliminary quarterly estimates	Extrapolators for second quarterly estimates and interpolators for revised quarterly estimates [1]	Latest annual estimates
Wage and salary disbursements by industry: [2]			
Farms	Trend extrapolation [3]	Trend extrapolation [3]	U.S. Department of Agriculture (USDA) estimates of farm labor expenses
Forestry, fishing, related activities and other	Trend extrapolation	Quarterly Wages and Salaries from BLS Covered Employment and Wages (CEW) [4]	Annual Wages and Salaries from CEW and USDA estimates of farm labor expenses
Mining	Monthly employment from the Current Employment Statistics (CES) survey [5]	Quarterly CEW	Annual CEW wages and salaries
Construction	CES monthly employment	Quarterly CEW	Annual CEW wages and salaries
Utilities	CES monthly employment	Quarterly CEW	Annual CEW wages and salaries
Manufacturing:			
Nondurable goods	CES monthly employment	Quarterly CEW	Annual CEW wages and salaries
Durable goods	CES monthly employment	Quarterly CEW	Annual CEW wages and salaries
Wholesale trade	CES monthly employment	Quarterly CEW	Annual CEW wages and salaries
Retail trade	CES monthly employment	Quarterly CEW	Annual CEW wages and salaries

Transportation and warehousing, excluding railroads	CES monthly employment	Quarterly CEW	Annual CEW wages and salaries
Railroads	Quarterly national payrolls from the Department of Transportation and the state employment from the Railroad Retirement Board (RRB)	Department of Transportation and RRB data	Annual state payrolls from the RRB
Information	CES monthly employment	Quarterly CEW	Annual CEW wages and salaries
Finance and insurance	CES monthly employment	Quarterly CEW	Annual CEW wages and salaries
Real estate and rental and leasing	CES monthly employment	Quarterly CEW	Annual CEW wages and salaries
Professional and technical services	CES monthly employment	Quarterly CEW	Annual CEW wages and salaries
Management of companies and enterprises	CES monthly employment	Quarterly CEW	Annual CEW wages and salaries
Administrative and waste services	CES monthly employment	Quarterly CEW	Annual CEW wages and salaries
Educational services	CES monthly employment	Quarterly CEW	Annual CEW wages and salaries, data from County Business Patterns (CBP), and Census Bureau population data [6]
Health care and social assistance	CES monthly employment	Quarterly CEW	Annual CEW wages and salaries
Arts, entertainment, and recreation	CES monthly employment	Quarterly CEW	Annual CEW wages and salaries
Accommodation and food services	CES monthly employment	Quarterly CEW	Annual CEW wages and salaries

Other services	CES monthly employment	Quarterly CEW	Annual CEW wages and salaries, data from CBP, and Census Bureau population data [6]
Federal civilian	CES monthly employment	CES monthly employment data	Annual CEW wages and salaries
Federal military:			
Active duty	Number of personnel and average pay by service from the Department of Defense (DOD) and payroll data from the Coast Guard	DOD number of personnel and average pay and Coast Guard payroll data	DOD and Coast Guard data
Reserves	Trend extrapolation	Trend extrapolation	DOD payroll outlay data
State and local government	CES monthly employment	Quarterly CEW	Annual CEW wages and salaries
Supplements to wages and salaries: [2]			
Employer contributions for employee pension amd insurance funds [2]	Estimates of wages and salaries by industry [7]	Estimates of wages and salaries by industry [7]	Estimates of wages and salaries by industry; supplemented by data from A.M. Best Company, the Social Security Administration, and other agencies [7]
Employer contributions for government social insurance [2]	Estimates of wages and salaries by industry [7]	Estimates of wages and salaries by industry [7]	Estimates of wages and salaries by industry; supplemented by data from BLS and U.S. Bureau of the Census. [7]
Proprietors' income: [2]			
Farm proprietors' income	USDA estimates of farm cash	USDA estimates of farm cash	USDA annual estimates of farm gross income and

	receipts and trend extrapolation	receipts and trend extrapolation	expenses
Nonfarm proprietors' income:			
Construction	Estimates of construction wages and salaries [8]	Estimates of construction wages and salaries [8]	Internal Revenue Service (IRS) gross receipts and net profits of proprietorships and partnerships and CBP number of small establishments
All other industries	Trend extrapolation	Trend Extrapolation	IRS and CBP data
Personal dividend income	Trend extrapolation	Trend extrapolation	IRS, Census Bureau, and Social Security Administration (SSA) data
Personal interest income	Trend extrapolation	Trend extrapolation	IRS, Census Bureau, and SSA data
Rental income of persons	Trend extrapolation	Trend extrapolation	IRS and Census Bureau data
Personal current transfer receipts			
Unemployment insurance (UI) benefits	UI benefits from the Employment and Training Administration (ETA)	ETA UI benefits	ETA UI benefits
All other	Trend extrapolation	Trend extrapolation	Data from SSA, Health Care Financing Administration (HCFA), Census Bureau, Department of Veterans Affairs (DVA), and other agencies

Contributions for government social insurance

Employer contributions for government social insurance [2]	Estimates of wages and salaries by industry [7]	Estimates of wages and salaries by industry [7]	Estimates of wages and salaries by industry; supplemented by data from BLS and U.S. Bureau of the Census. [7]
Personal contributions for government social insurance	Sum of the estimates of wages and salaries for all industries [7]	Sum of the estimates of wages and salaries for all industries [7]	Estimates of wages and salaries for the contributions by most employees; SSA, HCFA, Census Bureau, and DVA data for contributions by others
Addendum: Residence adjustment [9]	Estimates of wages and salaries and OLI by industry less personal contributions	Estimates of wages and salaries and OLI by industry less personal contributions	Estimates of wages and salaries by industry and Census Bureau and IRS data

1. The data used for the extrapolation of the second quarterly estimates are also used to interpolate the revised annual estimates to quarters in the preparation of the revised quarterly estimates

2. The quarterly estimates of wages and salaries, supplements to wages and salaries, and proprietors' income are prepared at the sector level of the North American Industrial Classification System (NAICS) and the annual state estimates are prepared at the subsector level.

3. The trend extrapolation is based on the relationship between the annual state estimates and the annual NIPA estimates.

4. Tabulations of wages and salaries from the Bureau of Labor Statistics (BLS) Covered Employment and Wages (CEW).

5. The Current Employment Statistics (CES) survey is conducted monthly by the state employment security agencies; the CES program is coordinated by the Bureau of Labor Statistics, which publishes the data in Employment and Earnings.

6. County Business Patterns is published annually by the Census Bureau. This series was not used for the 'annual state estimates of proprietors' income released in April 2004, because more current data were available from the Internal Revenue Service.

7. The use of the estimates of wages and salaries in the estimation of quarterly and annual supplements to wages and salaries and contributions for social insurance incorporates the

state relative changes and distributions of the source data used for wages and salaries into the estimates for the other components, for which more direct source data are unavailable.
8. For the quarterly estimates of proprietors' income in the construction industry, the quarterly relative changes in the estimates of wages and salaries are used instead of the annual trends in proprietors' income because the annual trend does not capture well the rapid and irregular fluctuations in the activity of this industry.
9. The residence adjustment is not a component of personal income.